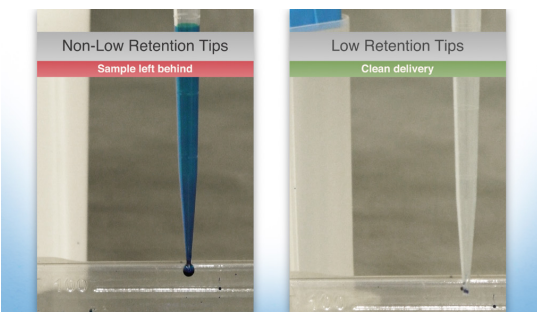# INCREASE ACCURACY AND PRECISION FOR THE RAININ® LTS® PIPETTE WITH XTIP4® PIPETTE TIPS BY BIOTIX

Can a pipette tip really improve your results?

Traditional pipette tips can have several issues that compromise results including: nonspecific binding of sample to the pipette tip, droplet formation, and poor fit. Engineers at Biotix have spent years developing technologically advanced pipette tips for better performance. Innovations in the xTIP4 Pipette Tips include:

- **X-Resin® technology** — xTIP4 Pipette Tips are made from a low retention resin that requires no coating, providing intrinsic low retention (non-stick) qualities across all volume ranges
- **Blade® technology** — eliminates droplet formation and the need for tip touch-off, reducing sample carryover and contamination
- **StarStop® technology** — creates a secure seal with FlexFit and guarantees low ejection force which improves your ergonomics
- **FlexFit® technology** — a patented technology that enables a secure seal with less force resulting in a accurate sample draw

How does xTIP4 compare?

Non-Low Retention Tips — Sample left behind

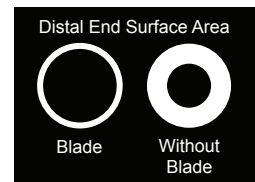Low Retention Tips — Clean delivery

Low retention with X-Resin

Sample retention (as seen on the left), or non-specific binding of sample to pipette tips, is a known problem especially with genomic DNA and proteins. Valuable sample can be left in the tip and out of the analysis. Most pipette tip manufacturers make both natural and low retention style tips. However, many researchers think they are using a low retention pipette tip until they try a Biotix pipette tip. To avoid confusion, xTIP4 Pipette Tips are ONLY available with Biotix's low retention X-Resin ensuring increased sample recovery and precision.

Reduced droplet formation with Blade technology

Distal End Surface Area — Blade — Without Blade

You may realize after dispensing your sample, you touch to the side of your vessel to ensure maximum sample recovery. With a standard pipette tip, surface tension at the distal end causes the formation of a droplet. These droplets contain valuable sample and loss of sample can lead to reduced accuracy. As illustrated above, Biotix has developed and engineered an optimal ratio of hole size to wall thickness. This optimal design minimizes the surface area, reducing the surface tension of your sample and the resulting droplet. In other words, no more tip touch-off!

Be sure you have a secure seal with FlexFit

Patented FlexFit technology incorporates alternating thick and thin regions along the circumference of the proximal end. When a pipette nozzle is pressed into a pipette tip, the shape of the proximal end is manipulated. With FlexFit, the thicker regions maintain structure while the thinner regions allow for flex, resulting in a secure seal with minimal insertion force. A more secure seal leads to a more accurate draw and no leakage. Less force can lead to more consistent results as well as better ergonomics for researchers.

Rainin's tip — xTIP4 with FlexFit

Biotix®

How do Biotix innovations impact pipette tip performance?

To determine the accuracy and precision of the xTIP4, **Troemner Corporation**, a leader in the areas of calibration and standardization, was commissioned. Three different Rainin LTS pipettes were used: 1000µL, 200µL, 20µL, and 2µL along with the corresponding Rainin LTS pipette tips and xTIP4 pipette tips from Biotix. Ten measurements for each volume were taken to evaluate accuracy and precision. This independent study demonstrates that xTIP4 preforms as good or better in reproducibility compared to the Rainin LTS pipette tips. The xTIP4 has also been found to pass ISO 8655 even without calibration.

Pipette	Volume (µL)	xTIP4 A 1000µL				Rainin A 1000µL			
		Mean (µL)	STDEV of 10	As Found E%	As Found CV	Mean (µL)	STDEV of 10	As Found E%	As Found CV
LTS 1000	1000	996.33	0.67	-0.37	0.07	996.03	1.44	-0.40	0.15
LTS 1000	500	498.56	0.34	-0.29	0.07	497.56	0.53	-0.49	0.11
LTS 1000	100	101.99	0.20	1.99	0.19	97.97	0.14	-2.03	0.14

Pipette	Volume (µL)	xTIP4 B 200µL				Rainin B 200µL			
		Mean (µL)	STDEV of 10	As Found E%	As Found CV	Mean (µL)	STDEV of 10	As Found E%	As Found CV
LTS 200	200	199.39	0.12	-0.30	0.06	199.58	0.14	-0.21	0.07
LTS 200	100	99.37	0.09	-0.63	0.09	99.42	0.14	-0.58	0.14
LTS 200	20	19.99	0.05	-0.07	0.26	19.96	0.04	-0.20	0.22

Pipette	Volume (µL)	xTIP4 C 20µL				Rainin C 20µL			
		Mean (µL)	STDEV of 10	As Found E%	As Found CV	Mean (µL)	STDEV of 10	As Found E%	As Found CV
LTS 20	20	20.08	0.012	-0.40	0.06	20.09	0.014	-0.45	0.07
LTS 20	10	10.02	0.010	-0.20	0.05	10.04	0.011	-0.40	0.11
LTS 2	0.5	0.502	0.006	0.40	1.18	0.497	0.006	-0.60	1.16
LTS 2	0.1	0.097	0.004	-3.0	4.48	0.098	0.005	-2.0	4.66

Conclusions

xTIP4 Pipette Tips by Biotix improve reproducibility leading to consistent results across experiments. X-Resin and Blade, contribute to higher reproducibility by maximizing your sample recovery. FlexFit forms a secure seal on both single and multichannel LTS pipettes to increase data reproducibility. FlexFit has the additional advantage of reducing the insertion force required for a seal placing less strain on shoulders, arms, and wrists.

Tips to increase pipetting accuracy

Use the below recommendations to improve your pipetting technique and maximize your accuracy and precision.

1. It is recommended to operate an air displacement pipette in the 35-100% nominal volume range
2. Always dial down your micrometer from the same direction to the desired volume setting
3. Pipetting in the vertical position can enhance performance by up to 2.5%
4. Use the correct immersion depth for the volume you are pipetting, dipping the tip too deep into the liquid can cause overdraw of sample
5. Use reverse pipetting when working with viscous solutions to increase your accuracy
6. Aspirate in a controlled fashion by smoothly releasing the plunger

Visit biotix.com to learn more about our tip technologies and ergonomic products